



FoxPlus Mechanical Layout and Design

43rd Annual AMSAT Space Symposium and Annual General Meeting

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KA3WDW

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FoxPlus Overview

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Hardware

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SV Assembly

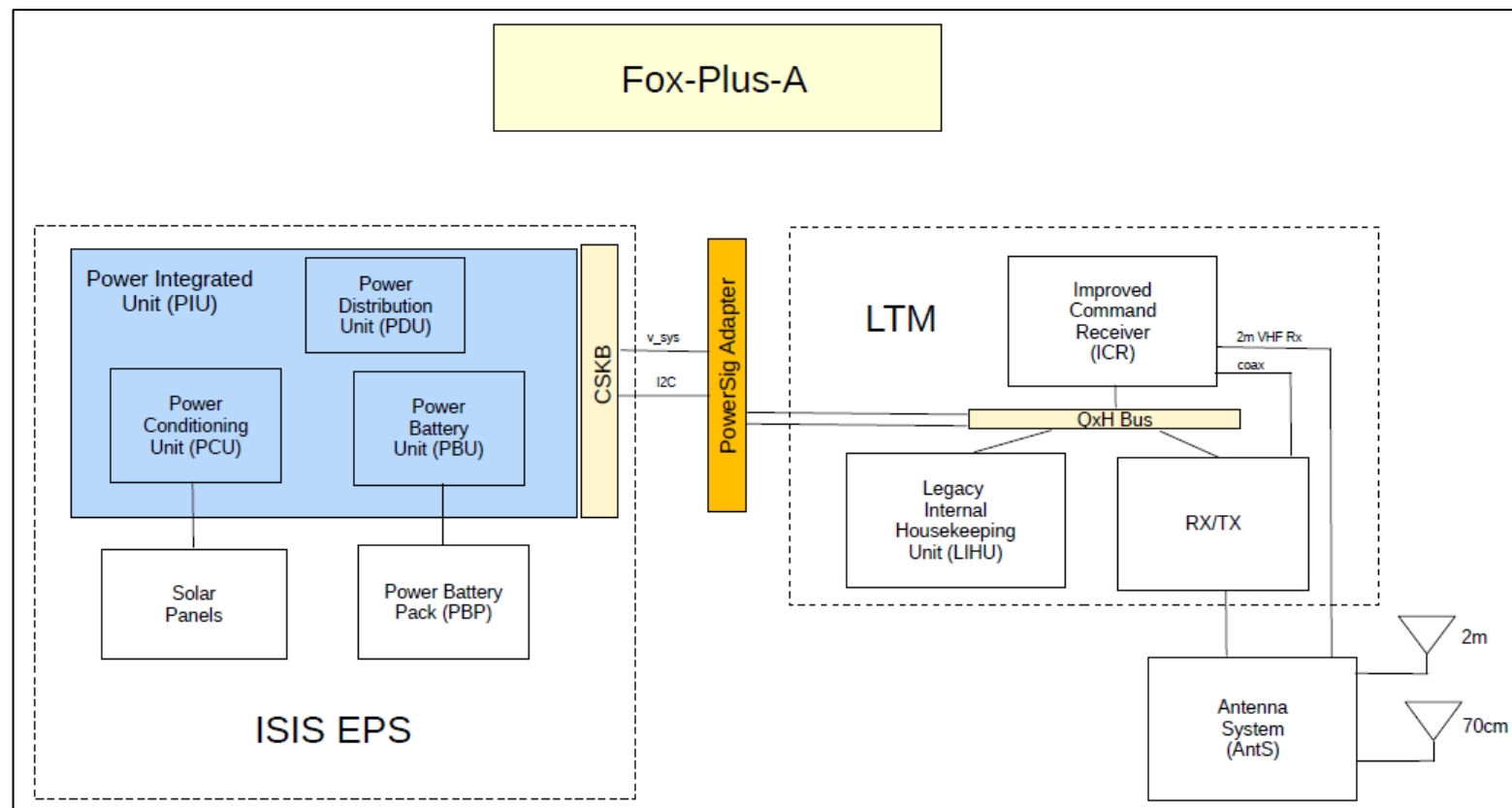
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Current Status

06

Path Forward

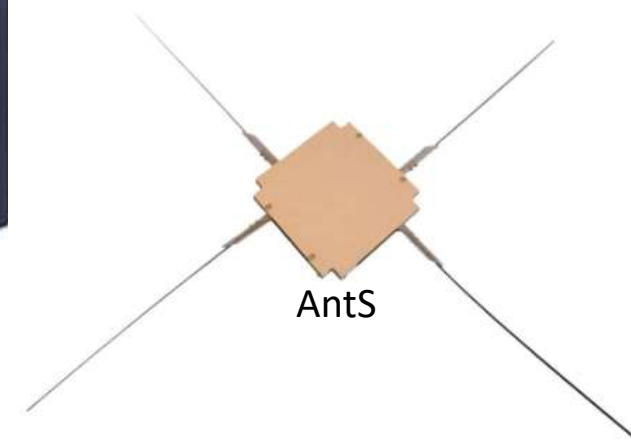
- 1U CubeSat design leveraging heritage AMSAT electronic “guts”
- Utilize COTS hardware to promote accelerated timeline to launch
 - Hardware procured for FoxPlus-A and –B
- LEO orbit



- Leveraging COTS 1U hardware from Innovative Solutions in Space (ISISpace) – isispace.nl
 - 1U Frame
 - Power Battery Pack (PBP)
 - Power Integration Unit (PIU)
 - AntS UHF/VHF Deployable Antenna
 - Solar Arrays (not shown)



1U Frame



AntS

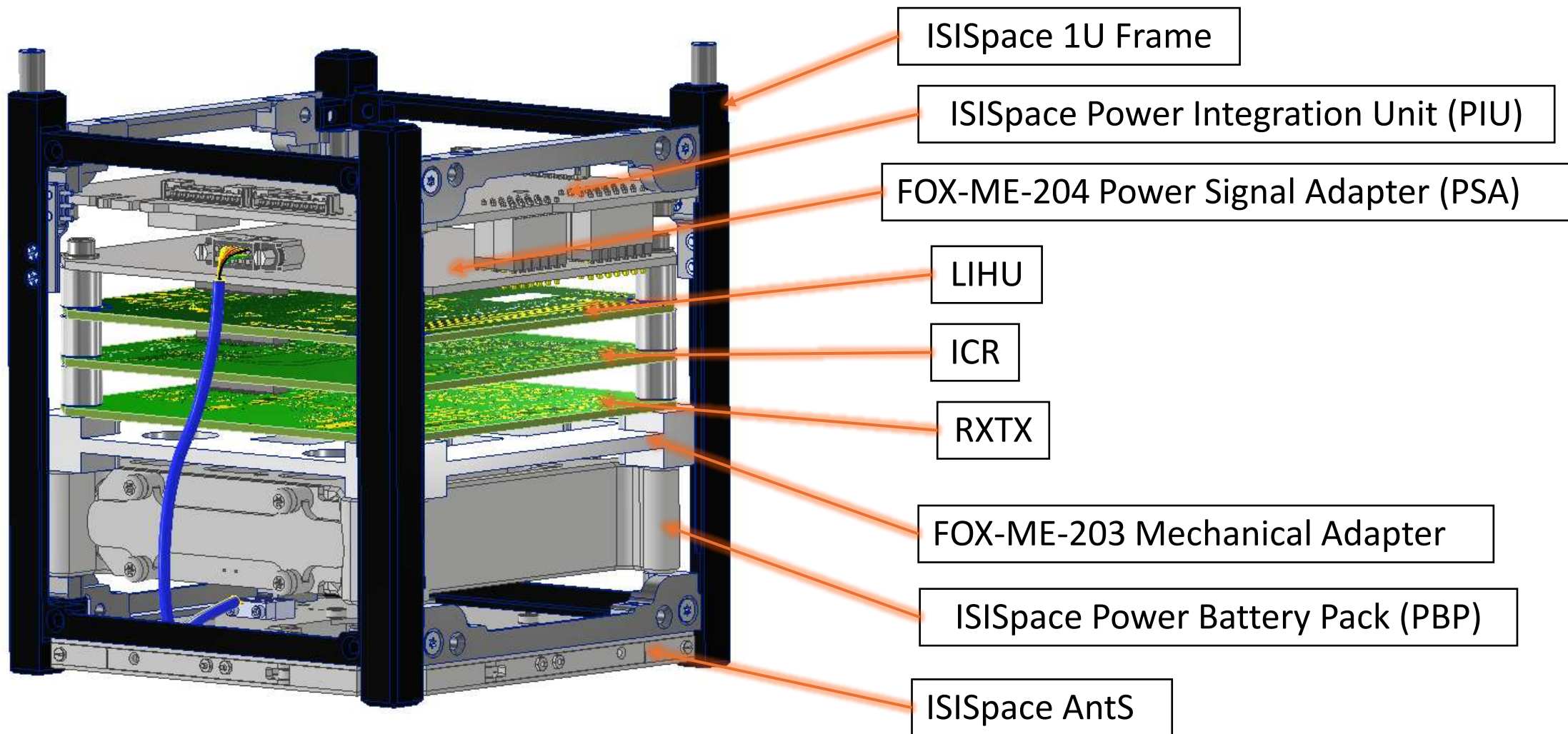


Power Integration Unit

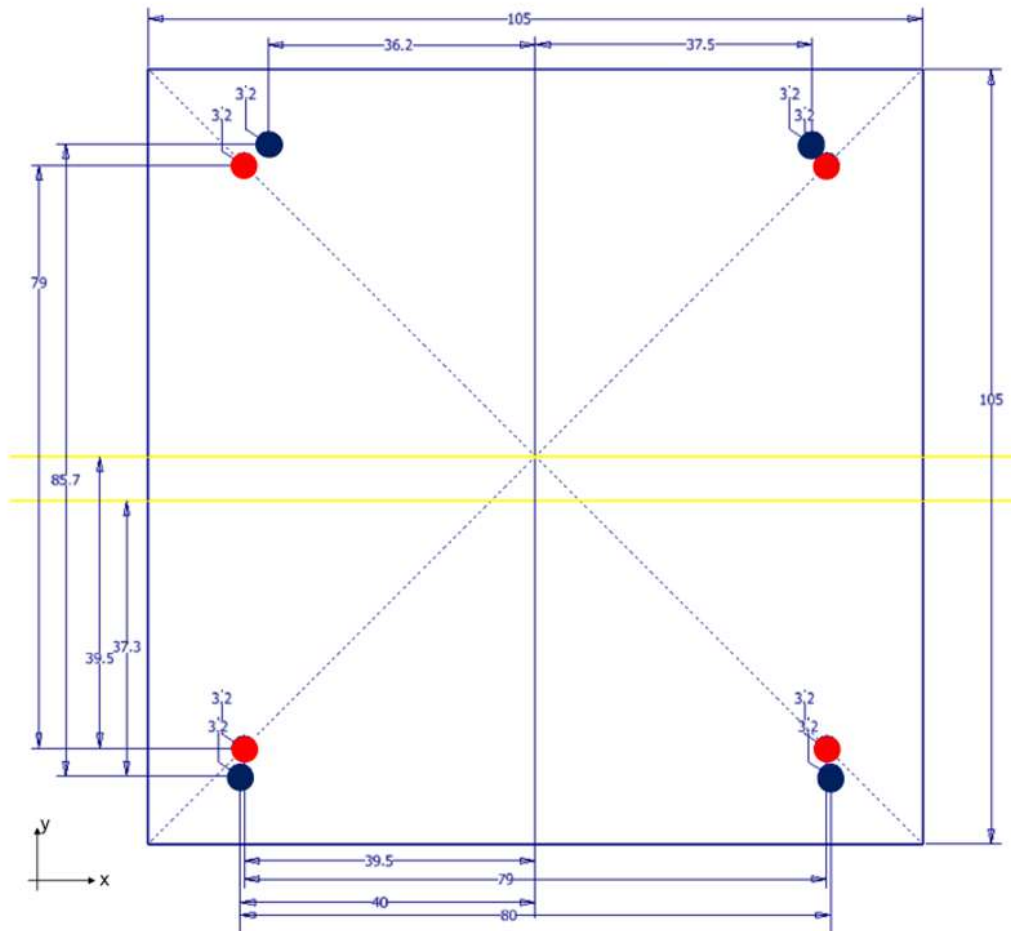


Power Battery Pack

FoxPlus Layout Overview

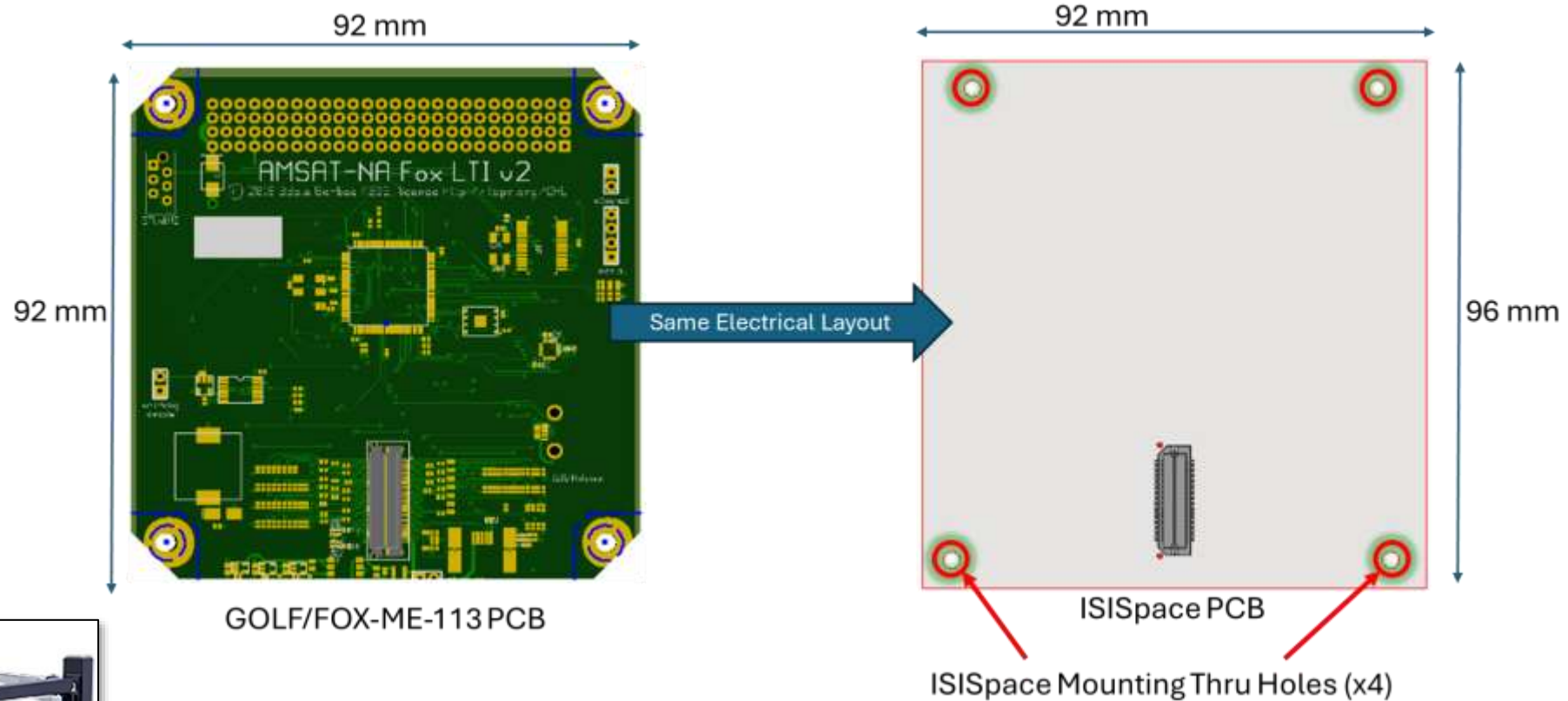


Integration Challenges



- Non-symmetric ISISpace hole pattern (frame, PBP, and PIU) present an integration challenge with PCB's built to FOX-ME-113
- 1U volume constraints restrict options to move the pattern in the XY-plane
- Adapter design challenged by proximity of holes; thru-holes or keenserts needed to facilitate mountain schema
- PCB stack-up considerations needed to maximize available space

COA#1 – Adopt ISISpace Mounting

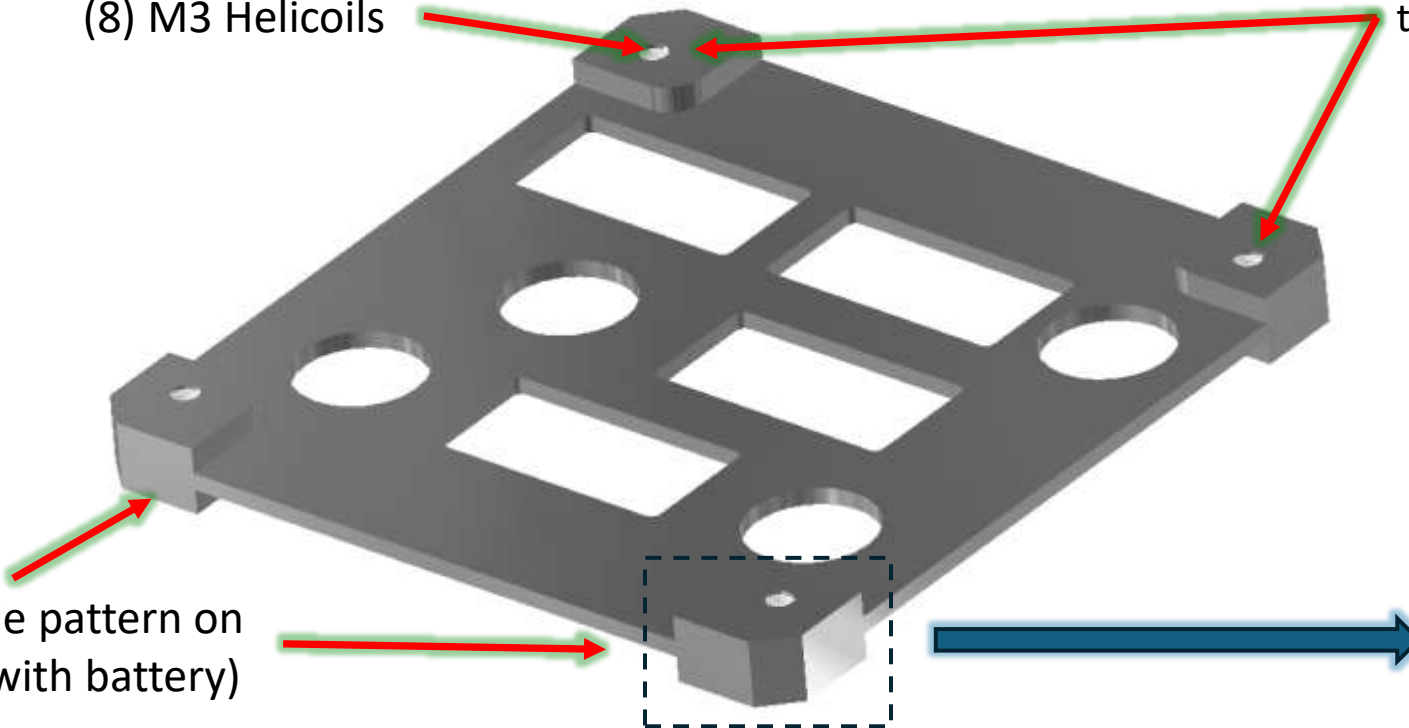


Pros	Cons
Easy mechanical integration	New boards need designed/made
Leverage ISISpace assembly	Incompatible design
Space efficient	New ICD

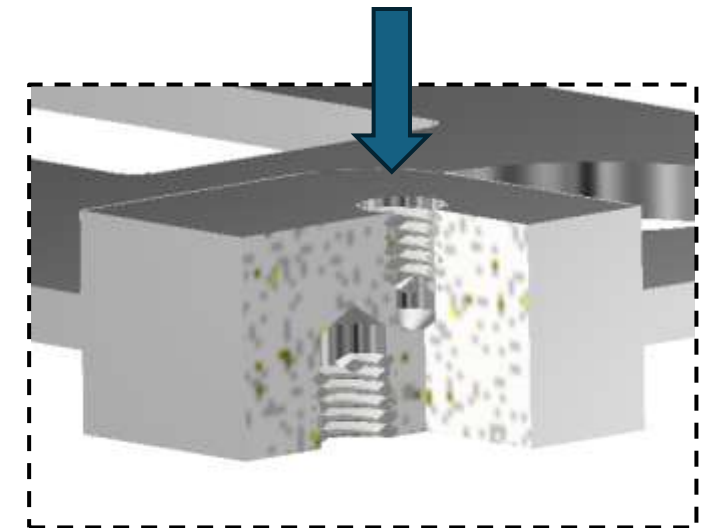
COA#2 - Adapter Design

(8) M3 Helicoils

(4) GOLF/FOX-ME-113 hole pattern on top (mate with RXTX/ICR/IHU stack)



Minimal difference between hole patterns makes this challenging



3/4-X Section

Pros

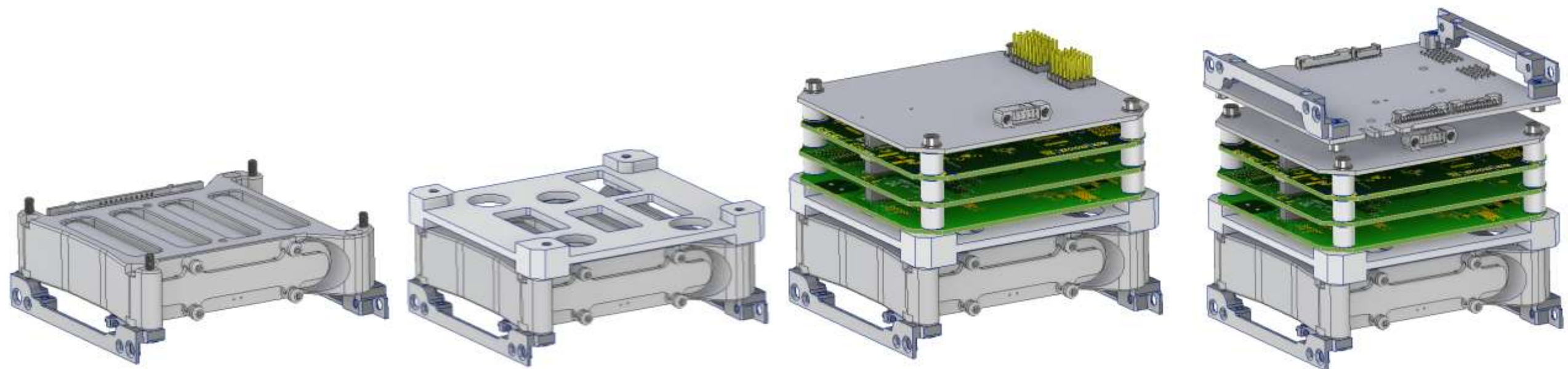
Cons

Uses existing LTM design/boards

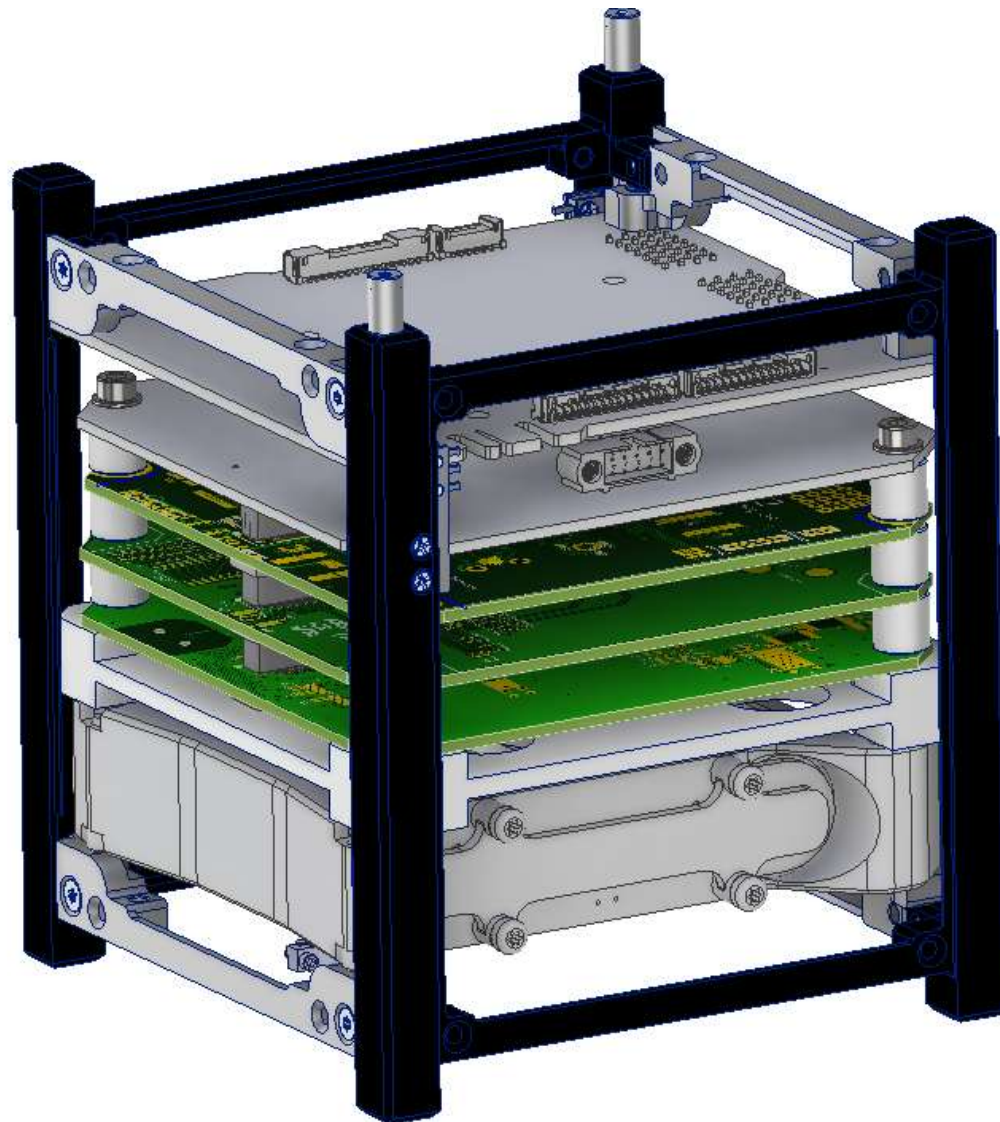
Complicated integration

Less space for PCBs

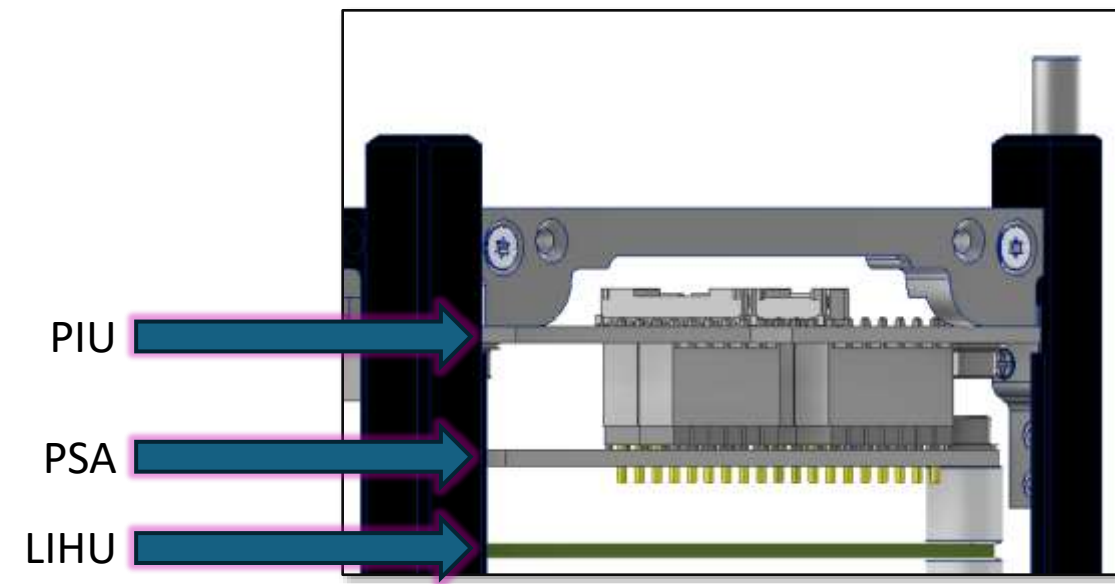
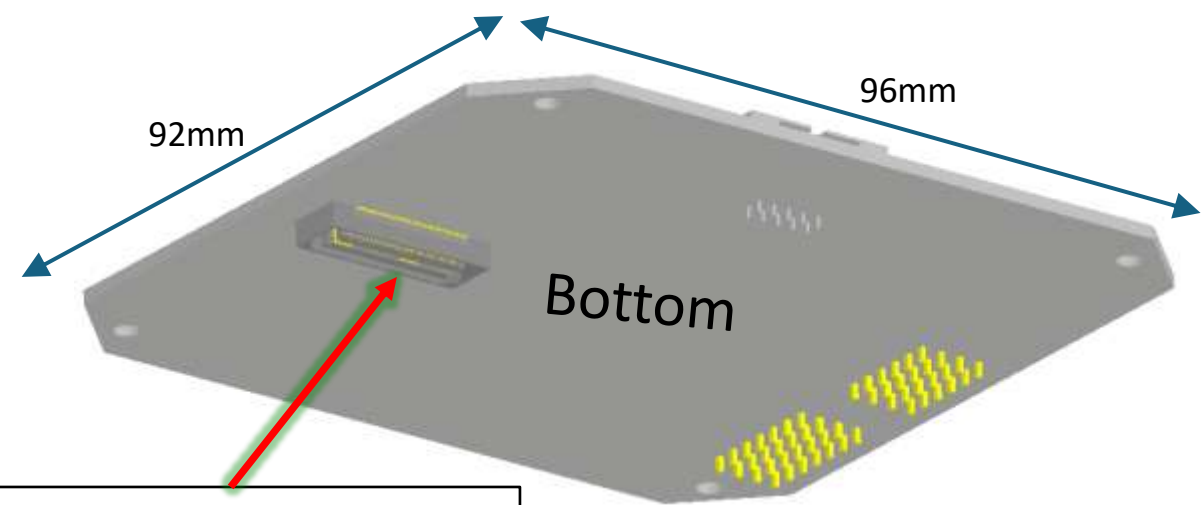
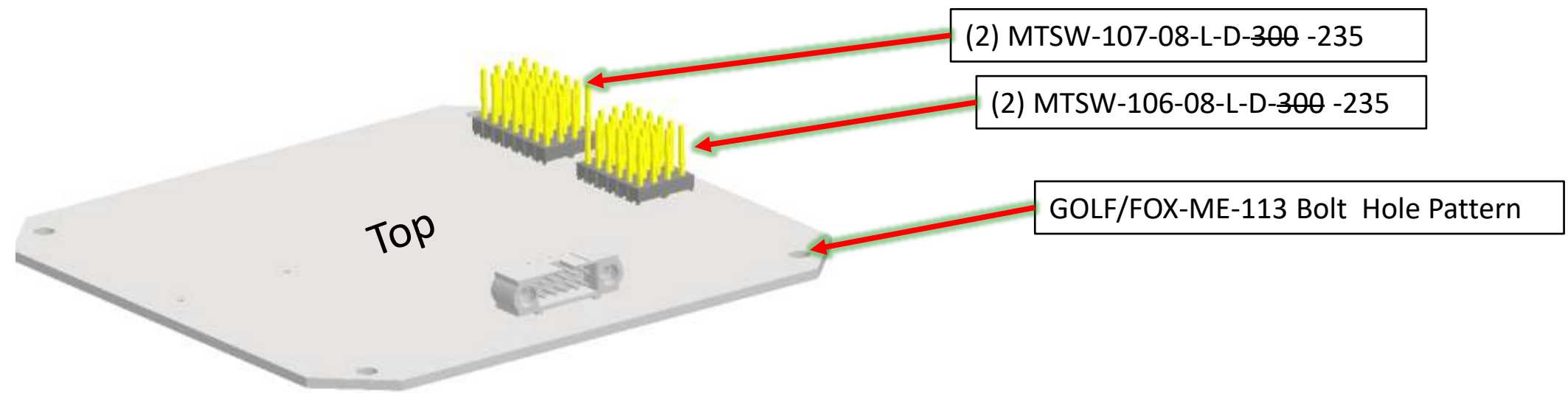
Shock/vibe risk

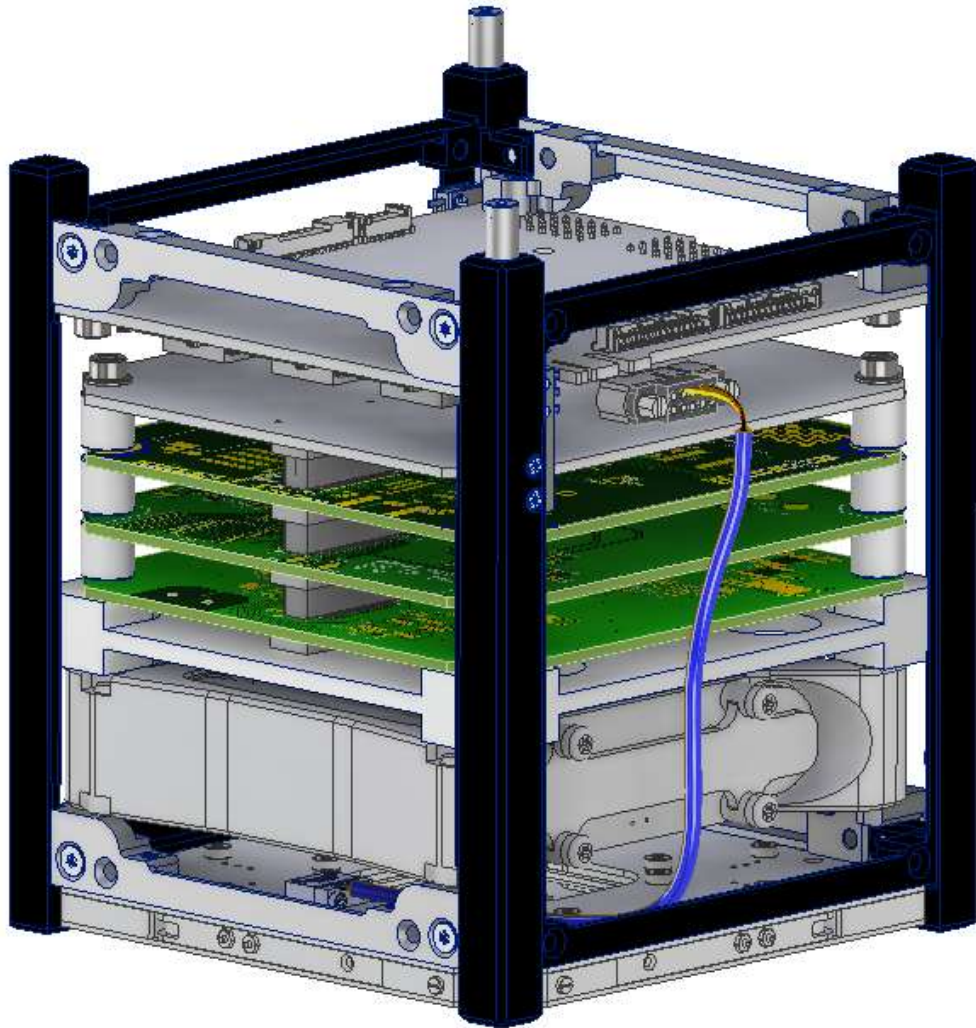


Assembly Process



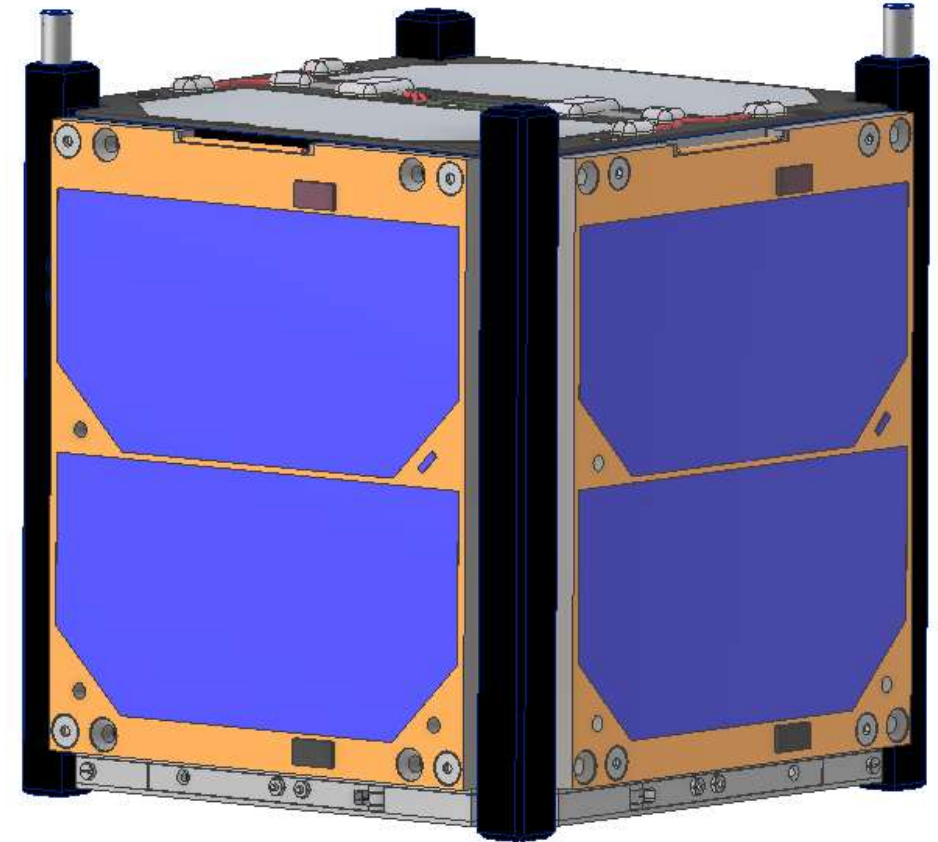
Power Signal Adapter





- FOX-ME-204 Power Signal Adapter design finalized; release pending minor updates
- FOX-ME-203 Mechanical Adapter drawing Work In Progress (WIP); metal parts fabricated and in-house
- Hardware (fasteners, spacers, etc.) in-house; mechanical fit model constructed on ISISpace assembly jig
- Solar Array “blanks” designed, fabricated, and in-house
- FOX-ME-202 (TLA) and Assembly Procedures WIP

- Route wires/cables as needed leveraging built-in AutoDesk Inventor toolbox
- Support Engineering Model (EM) buildup and subsequent tests
- Finalize and release drawings and documents to support Flight Model build, test, and launch
- Update design and layout as needed for FoxPlus-B



End

